TEXTILE READER'S GUIDE

Classification of Contents

Fibers 925
Yarn Production 929
Fabric Production 932
Standard Finishing 934
Dyeing and Printing 937
Special Finishing 944
Semi-Annual Index To Articles
Index to Authors

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Abstracts

FIBERS A

Natural Fibers A 1

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Anon. *Textile Mfr.* 206-207 (April, 1952)

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Swelling capacities of fibers in water. I

Lars A. Welo, Hilda M. Ziifle, and Leopold Loeb. Textile Res. J. *22*, 254-61 April 1952.

A rapid method for determining the swelling capacity of such fibers as cotton, rayon, nylon, etc., is discussed. It is based on the measurement of the rate of loss of moisture from a moisture-saturated sample. At first the moisture is lost at a nearly constant rata (believed to be the non-swelling water external to the fiber) then the drying rate changes and steadily diminishes. The moisture at this point of transition in the desiccation rate is considered to be indicative of the swelling capacity of the fiber. The maximum regain values from the desiccation rate technique, when expressed in terms of volume increases, agrees with the swelling capacities as determined by microscopic measurements.

Swelling capacities of fibers in water. II

Lars A. Welo, Hilda M. Ziifle and Allan W. McDonald. Textile Res. J. *22*, 261-73 (April 1952)

The use of the centrifuge for measuring the swelling capacities of fibers in water has been investigated. The complication of dealing with the 2 variables of speed and time of centrifuging simultaneously has been cimcumvented by noting that straight lines were obtained when the mois-

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ture regains of the sample were plotted against the squares of the rotational speeds. The intercept of the straight lines on the moisture regain axis are characteristic for a given fiber in a given physical form. A qual. theory of the behavior of the fiber-water system in the centrifuge is developed.

The effect of micro-organisms and of weathering on cotton textiles. II

C. H. Bayley. Can. Textile J. *69*, 59-63 (April 25, 1952)

The effect of micro-organisms and weathering in causing the deterioration of cotton textiles is reviewed. The physical and chemical aspects of deterioration by weathering are considered. The factors influencing the growth of micro-organisms and the conditions conducive to micro-biological attack are discussed.

Wool-acrylonitrile polymer blend

Stockman C. Peckham (to E. I. duPoint de Neumors & Company) USP 2 595 977, May 6, 1952.

Wool fibers are stabilized against shrinkage by blending with the wool at least 15% of a staple fiber prepared from a polymer containing at least 85% of acrylonitrile.

Artificial fibers A 2

Antistatic compositions

Brit. P. 662 542. Courtaulds. *J. Soc. of Dyers & Cols. 68*, 95 (Mar. 1952).

Hydroxyalkylamine salts of dibasic acids are good antistatic agents for use on textiles.

Dynamic modulus of elasticity of viscose fibers

H. de Vries. Applied Sci. Res. *A3*, 111-24 (1951); Chem. Abs. *46*, 3283 (April 10, 1952)

The dynamic modulus of elasticity (E) of regenerated cellulose was traced separately by measuring E while relaxation of stress was proceeding in an extended fiber and while the thread was being extended under a constant load: creep. It is inferred that E is virtually dependent on the extension of the particular regenerated cellulose fiber only. Two yield ranges in terms of extension of the fiber are distinguished.

The effect of micro-organisms and weathering on man-made fibers. I

C. E. Coke. Can. Textile J. *69*, 53-54, 57, 58 (April 25, 1952)

This paper briefly reviews the current status of the action and effect of micro-organisms and

weathering on man-made fibers. Herein, micro-organisms are considered to include mildew and bacteria; and weathering is defined as the action of sunlight, air and rain. One or more of these factors is generally responsible for the rotting of textile materials, which is accompanied by loss in strength and some loss in weight. Rayon, Acetate, Nylon, Orlon, Dacron, Dynel and Protein fibers are considered.

Fast dyeing properties feature new X-51 acrylic fiber

R. C. Swain. America's Textile Reptr. 66, 68-9, 73 (Mar. 20, 1952)

The new X-51 acrylic fiber, developed by American Cyanamid Co., is based on acrylonitrile as a raw material and has two forms, crimped staple and continuous filament, each of which has physical properties which may differ from those of the other. Both forms of the fiber have a fairly smooth surface, a circular cross-section, semi-dull luster, and exhibit certain skin effect. Wool-like textiles with the strength of cotton fabrics have been obtained, and the fabrics are said to hold creases even after washing, dry quickly, be resistant to acids and alkalis, be mothproof, non-shrinking, easily washed or dry cleaned, highly resistant to attack by insects or mildew, dyed easily with excellent fastness, etc. A discussion of the properties of the new fiber is presented. Pilot plant production has not yet hit its full capacity, and no decision on future production plans has been made.

Functional qualities of X-51

Anon. *America's Textile Reptr. 66*, 13-14, 48 (Mar. 27, 1952)

The high fiber tenacity, low specific gravity or large bulking capacity, and other functional qualities of American Cyanamid's new acrylic fiber, X-51, indicate that fabrics made from this fiber will give satisfactory wear without possessing too much weight and will possess strength, fullness, softness, flexibility, and warmth. To obtain the most satisfactory fabrics, consideration must be given to the methods of manufacture, amount of twist, length and diameter of the fiber, etc.

Orlon's functional qualities advantageous to consumers

Donald F. Holmes. *America's Textile Reptr. 66*, 49, 81 (Mar. 20, 1952).

Wrinkle recovery; press and shape retention under dry and moist conditions; ease of ironing and laundering; dimensional stability; good

strength; abrasion resistance and flex life; resistance to degradation by acids, solvents, bleaches, or heat; etc. are among the many outstanding qualities of orlon discussed in this article. Also discussed are the difference in the staple and continuous filament yarn and the processing, dyeing and finishing of orlon.

Predicts dynel will be most economical of acrylic fibers

Howard S. Bunn. *America's Textile Reptr. 66,* 15-16, 27 (Mar. 20, 1952)

A review is given of the outstanding characteristics and the many end products of dynel. Announcement is made of plans for the construction of a new dynel staple fiber plant by Union Carbide with a capacity of 20 million pounds per year.

Says new synthetics have place in Marine Corps use

Wm. H. Payne. *America's Textile Reptr. 66,* 55, 63, 65 (Mar. 20, 1952)

Tests on a suitable kersey uniform fabric for the Marine Corps using wool blends with such fibers as dacron, orlon, dynel, and acrilan have to date shown that the synthetic substituted fabric is superior in strength, resistance to abrasion, and in all physical tests required to 100% wool fabrics. The processing of synthetic substituted kersey cloth is briefly discussed.

Another example of how the functional qualities of the newer synthetic blends is giving better fabrics to the Marine Corps is the nylon, rayon, green M-2 material for raincoats with a wool, cotton liner. This fabric has saved 40-50% and provides excellent water repellency, strength, and fastness properties. Other examples are also cited.

Treatment of "Ardil"

I. C. I. and G. K. Simpson. Brit. P. 665,462 *Dyer 107,* 431, 433 (Mar. 21, 1952)

A method is claimed for increasing the strength of insolubilized protein filaments or fibers, which have been dyed in acid dye baths, so as to permit them to be more readily processed. The method comprises treating the fibers in an aqueous solution of a salt of which the metal of the cation is selected from the group consisting of mercury, uranium, chromium, zinc, cadmium, and aluminum. Solutions of these salts, excepting the mercury salts, should contain formaldehyde. Salts particularly suitable for the process are mecuric acetate, uranyl acetate, basic chromium sulfate, aluminum sulfate, zinc chloride, and cadmium acetate.

Vicara now used in many blends

John H. Karrh. *America's Textile Reptr. 66,* 35, 67, 81-2 (Mar. 20, 1952)

Vicara is quite similar to wool but has many outstanding properties of its own. It is being spun and woven on all systems in commercial use, and any basic dyeing difficulties are confined to blends with some of the newer synthetics. A discussion is given of some of the outstanding properties of Vicara, and examples are cited of some of the vicara blends that are being used.

YARN PRODUCTION B

Fiber preparation B 1

Fiber blender

Leslie A. Runton (to J. P. Stevens & Co., Inc.) USP 2 594 489-90-91, Apr. 25, 1952.

These patents disclose devices for blending fibers and also a conveyor for feeding and spreading loose fiber into sheet form in preparation for blending.

Carding and Combing B 2

High licker-in speed permits 40% increase in card production

E. A. Bentley. *Textile Industries 116,* 100-103, 231 (May 1952).

See front section.

New cotton card shown at Milan Fair

Anon. Daily News Record, 29 (May 5, 1952).

See front section.

To reduce neps . . . do these things

J. F. Bogdan, & Ivan Y. T. Feng. *Textile World 102,* 91-106 (May 1952).

See front section.

Spinning B 4

Famous name parts and materials contribute to new Gwaltney frame

Anon. *America's Textile Reptr. 66,* 27, 29, 58-9 (Apr. 3, 1952)

The cooperation of the many suppliers of component parts and equipment used in the new Gwaltney Spinning frame with the Saco-Lowell Co. has made possible specially designed parts that help in giving the machine its potential capacity for top performance. More than 1500 pounds of aluminum are found in each spinning frame and include extrusions, die castings, and

sheet aluminum. The two spindle rails, the ring rail, and the two rods ring guide bars are all aluminum extrusions; and aluminum die castings are used for roll stands, various brackets, creel bases and girts, etc. Special bobbins designed for the New Era spindles and specially designed travelers to take advantage of the new speed potential of the frame are other examples of the research done by the suppliers. Features also mentioned include Hyatt roller bearings for the cylinder shaft; Alemite hydraulic fittings; Parks-Cramer frame and up-draft cleaning; an umbrella type creel which eliminates conventional creel boards, etc.

Hannah develops cap spinning unit

Anon. *Daily News Record*, Page 29 (May 5, 1952).

See front section.

Higher production, lower upkeep features new spinning frame

Anon. *America's Textile Reptr. 66*, 10-11, 15, 17, 19, 21, 23, 25 (Apr. 3, 1952)

The new Gwaltney Saco-Lowell spinning frame is reported to have combined increased production, improved work load, and a higher quality product at lower unit costs. Such things as larger packages, less frequent doffing, far less cleaning and lubrication, etc. make this frame one of the most efficient ever produced. Among the outstanding features of the new frame are: Pneumafil waste collection system; New Era double ball-bearing spindles; drafting element, based on Shaw theory, with 60° pitch, anti-friction bearings on top and bottom rolls and new pressure system; specially designed water-cooled motor; umbrella creel of ample size to hold 12 x 6 roving bobbins for double roving; new builder motion designed to produce all the common spinning winds; narrow frame of light weight materials with draft and twist gearing enclosed in smoothly finished compact head-end; etc.

Increase package size by one-half on coarse counts

Anon. *America's Textile Reptr. 66*, 9-10 (April 10, 1952)

At Mt. Vernon-Woodberry Mills savings in operating costs have been achieved through the successful use of large packages in spinning coarse yarns. By using Whitin F2 spinning frames equipped with a modified builder motion, linkages and lifter rail mechanisms, package sizes have been increased to 14.5 ounces with an 11-inch traverse. The number of ends down per thou-

sand spindle hours has been unaffected by the increase in traverse length and no difficulty in winding off has been experienced. Tests conducted by the mill laboratory reveal an improvement in breaking strength.

New cotton shown at fair in Milan, Italy

Anon. *Daily News Record*, Page 29, (May 5, 1952).

See front section.

Procedures for spinning, weaving, knitting X-51 fiber

C. W. Bendigo. *America's Textile Reptr. 66*, 71, 73 (Mar. 20, 1952)

The X-51 acrylic filament yarn has been thrown and woven or knit on conventional equipment by using the same procedures employed with any other continuous filament synthetics, and the staple has been processed on cotton, woolen, and worsted equipment with a minimum of modifications and difficulties. In this discussion on the processing of X-51 acrylic fibers, various points are stressed such as: yarns having larger diameter for any denier than rayon or acetate; need for good blending; bulkiness may necessitate minor changes on pickers; low twist multiple in roving advisable; lower than normal twists necessary due to bulk and other physical properties, etc.

Spinning frame drafts changed by levers

Anon. Staff. *Textile Industries 116*, 211 (April 1952).

See front section.

Yarn processing B 6

Rayon cake wrappers

Am. Viscose Corp. Brit. P. 663, 931 Dyer 107, 340 (Mar. 7, 1952)

Wrapper sheets, for rayon cakes undergoing after treatment, which will shrink with the cake as water is removed from it during drying, are made by associating cellulose ester fibers with fibers of a material not affected by aqueous saponifying agents for the ester. The cellulose ester and other fibers may be bonded together by (1) treating with a solvent for the cellulose ester and then drying, (2) applying a coating of film-forming material which is not affected by the saponifying medium and serves to hold the ester fibers in contact with the sheet, or (3) heating, if the cellulose ester contains a plasticizing agent. Treatment of the wrapped package with an aqueous saponifying agent converts the cellulose ester

fibers in whole or in part to reconstituted cellulose so that in washing or drying the package, the reconstituted cellulose fibers shrink strongly, causing cockling of the remaining fibers bonded to them and a permanently set crepe effect to the product.

Uniform rayon package treatment

Celanese Corp. of America. Brit. P. 664, 040. *Dyer 107* 339 (Mar. 7, 1952)

Apparatus based on the principle of interrupting the flow of liquid at intervals in rayon package treatment, particularly in the saponification of cellulose acetate, is claimed. It comprises a stainless steel tubular support, having a number of perforations and peripheral grooves near its upper and lower ends. The support is mounted between a rubber disc, fastened to a plate, and an annular rubber gasket, fastened to another plate with an aperture to admit the sapoinifying agent. The plates are drawn together by the rods to produce a liquid-tight seal, and the entire assembly is positioned in a chamber with a loosely fitting cover. The saponifying agent is forced through the material by a pump which draws it from any suitable source; and a valve, periodically closed by an automatic timer, interrupts the flow of saponifying agent at intervals. A conduit with a valve permits the saponifying agent to be drained from the chamber and returned to the source of supply after replenishment. By the adjustment of this valve the level of the agent in the chamber may be controlled. More uniform saponification in a considerably shorter time is claimed for the apparatus.

Yarn Application B 9

Nylon-covered elastic yarn

Brit. P. 661 530. U. S. Rubber Co.; *J. Soc. of Dyers & Cols. 68,* 104 (Mar. 1952)

Vulcanized rubber thread is stretched to a selected extent, and coated with nylon from a solution in e.g. formic acid. A strong yarn capable of rapid extension and retraction over at least 50% of its length is produced.

FABRIC PRODUCTION C

Yarn Preparation C 1

New approach to metering claimed for new device

Anon. *Daily News Record,* 30 (May 5, 1952).

See front section.

New beam brake designed for cotton slasher creels

Anon. Textile Age, 52 (May 1952).

See front section.

Nylon yarn sizing

Monsanto Chemical Co. Brit. P. 665,199 *Dyer 107,* 433 (Mar. 21, 1952)

This sizing treatment for nylon yarns is said to give a semi-permanent finish, if required, and to not interfere with the absorption of dyes or finishing agents when the goods are not desized after weaving. The yarn is treated in the size box of a conventional slasher with an ammonium, quaternary ammonium, sodium or potassium salt of a copolymer of styrene and an alkyl ester of maleic acid, and then dried over cans or by any other suitable method. The alkyl esters used may include the methyl, ethyl, propyl, butyl, and secondary butyl esters of maleic acid. If a semi-permanent finish is desired and ammonium salts are used, the yarns or fabric must be dried at preferably 250 to 300°F to set the resin. If a semi-permanent finish is desired and sodium or potassium salts are used, the yarn or fabric should be subjected to a dilute acid finishing bath to set the resin.

Special fabrics C 4

Apparatus for coating fabrics

Carleton S. Francis, Jr. (to American Viscose Corp.) U. S. 2,593,553 4-22-52.

Apparatus for producing coated fabrics by the application of transfer films of thermoplastic material from temporary backing sheets.

Loop surfaced, novelty fabric result of good use of acetate yarns

Anon. *America's Textile Reptr. 66,* 51, 53, 63 (March. 20, 1952)

An analysis is made of a novelty rayon yarn fabric, possessing a smooth, tight appearance on the back and a pile or loop covering the face. The effect is somewhat similar to double or backed cloth, but this fabric has far more flexibility. The warp yarn is 100 denier acetate with about 170 ends per inch and the filling yarn is 300 denier acetate with about 38 picks per inch. The novelty yarn used is composed of 1 end of 200 denier nylon as a core or base yarn twisted with 1 end of 300 denier acetate as a loop or bunch yarn and this resulting yarn is twisted with 1 end of approximately 28/1 spun rayon as a binder. The novelty yarn is stitched down on the face of the fabric by raising about one out of 12

warp ends across the width of the cloth. This gives an over-all soft pile texture.

Non-woven fabrics

B. M. Glover. Brit. P. 663 732; *J. Soc. of Dyers & Cols. 68*, 104 (Mar. 1952).

Carded web coming from a scribbling machine is laid in superposed layers on the moving platform of a Blamiresatype feed. Each layer is sprayed with a mist-like spray of a liquid plastic. The layers are then combined together by means of heat and pressure.

Vicara blend suitings given good report

Anon. *America's Textile Reptr. 66*, 15-13 (Apr. 10, 1952)

A viscose-vicara blend fabric in a 14-ounce weight, which is available in subdued worsted suiting patterns, is analyzed. The fabric is said to have a satisfactory amount of abrasion resistance with softness or fullness obtained through the vicara fiber. The higher specific gravity of the viscose fiber tends to reduce the thickness or fullness obtained with wool. A certain amount of resilience is obtained by use of a coarser denier viscose fiber with a medium denier vicara fiber. Both warp and filling yarns are in two-ply form. The layout for the fabric is given.

Wax-coated fabric

Karl A. Fischer. USP 2 594 547, Apr. 25, 1952.

A fabric is coated with a mixture of a synthetic paraffin (by product of the hydrogenation of carbon monoxide) with a polyvinyl ether or ester as a plasticizer, the paraffin melting above 100° C., to render the fabric capable of being laundered in boiling water.

Inspection and testing C 5

Chasing fabric faults

N. Jackson. *Dyer 107*, 415-16 (Mar. 21, 1952).

Faults and damages in fabrics associated with different aspects of fabric structure are discussed. The faults are grouped into the following categories: yarn twist; yarn crimp; variable pick spacing, diamond barring; warp stripiness and streakiness; shade differences due to yarn differences; selvedge defects; and miscellaneous.

STANDARD FINISHING D

Activation of chlorite bleaching solutions

Solvay and Cie. Brit. P. 665,265 *Dyer 107*, 435 (Mar. 21, 1952).

The acidification of chlorite baths to activate their bleaching power gives rise to the evaluation of ClO_2 throughout, and only the portion produced in the immediate proximity to the material to be bleached is used rationally. The rest of the ClO_2 escapes from the vat or corrodes its inner walls. To prevent this condition, the material is immersed in the solution of the activating agent before being treated in the chlorite bath so that it brings to the bath only the necessary amount of activator.

Adjustable nozzles in drying machine

P. Deck. Brit. P. 665,238. *Dyer 107*, 435 (Mar. 21, 1952).

A fabric and paper drying machine, in which the drying nozzles are adjusted so that they act only on the width of material being dried, consists of clamps for holding the fabric with air ducts arranged below and above the fabric. The air ducts are connected to swiveling nozzles which are hollow, have pivoted ends, and tapes from the pivoted ends to their free ends. The nozzles have surfaces parallel with the fabric and are brought to a short distance from it. Elongated slots extend from the pivoted ends and direct heated pressure-air on to the fabric; and at the free ends rollers are fitted which may be moved in the lengthwise direction of the frame between parallel guide rails. The adjustment of marginal rails, which are provided, and the guide rails across the lengthwise axis of the frame simultaneously pivots the nozzles about the sockets so that the width on which the nozzles act is automatically adapted to the adjustment of the marginal rails.

Announces new squeeze roll unit

Anon. *America's Textile Reptr. 66*, 35 (Apr. 10, 1952).

A new heavy squeeze roll unit for fabrics up to 50″ face and which may also be used for padding is fitted with a top rubber covered roll and bottom stainless steel roll both mounted in self aligning spherical roller bearings. Pressure from 1 to 15 tons is applied by air cylinders with individual pressure controls. The drive is from a motor through a variable speed unit. Mfr.: Birch Brothers, Inc.

Care of cropping machinery

T. H. Sedgwick. *Dyer 107*, 407-10, 414 (Mar. 21, 952).

The principles of the working of the lathe

and its fittings used for grinding the blades and spirals of cropping machines are reviewed, and the method of lathe grinding for the spiral cutters and ledger blade is described. The setting and final adjustments of the blade and cutters are also discussed.

Methods of cropping

T. H. Sedgwick. *Dyer 107*, 251-3 (Feb. 22, 1952).

Cropping or shearing of fabrics is done to clear the surface of the cloth of superficial fibers and to enhance the characteristics of the design and color. On all classes of woolen and worsted fabrics, except fleece finished goods, cropping or shearing is an essential part of the dry finishing process with the degree of cropping governed by the finish to be obtained. The various types of shearing machines, including the hollow bed, rubber bed, solid or spring bed, and the cushion or felt bed, are discussed together with their uses and advantages. Also discussed are the cropping procedure, and faults in cropping with suggested remedies.

Modern finishing in the Hebrides

T. A. Hum. *Dyer 107, 416* (Mar. 21, 1952).

Genuine Harris tweed is made from virgin Scotch-grown wool which is carded, spun, dyed and woven, and finished in the outer Hebrides. Carding and spinning is done on very fine modern equipment, but then the old method of stake warping is used and weaving is done on the handloom. After weaving, however, modern methods of finishing are followed. Dyeing and scouring are briefly discussed.

Process for setting knitted fabrics

Arthur N. Tingley (to American Viscose Corp.) USP 2,594,521, Apr. 25, 1952.

Yarns are conditioned for knitting by the application of a normally solid, heat-softenable wax-like substance. The dried yarns are then knitted and immediately after the knitting, all portions of the fabric are subjected to dry heat to soften the wax-like substance, and thereafter the fabric is cooled to set the stitches.

Rodney Hunt machine

Rodney Hunt Machine Co. Brit. P. 664,511. *Dyer 107*, 340 (Mar. 7, 1952).

A modification is claimed for the continuous liquid treatment machine for textiles (see Brit. P. 631, 279) in which the fabric passes in loop formation over spaced upper and lower rollers, the lower rollers only being driven at a surface speed exceeding that of the adjacent fabric.

A stripping bar, parallel with each roller, is provided to overcome a tendency of some fabrics to adhere to and wrap around the lower rollers.

Shirley drying machine

British Cotton Industry Research Assoc. Brit. P. 663,161. *Dyer 107*, 340 (Mar. 7, 1952).

A heated cylinder drying machine, especially applicable to lengths of sized warp and textile fabrics, has a cover following in shape the curvature of the cylinders. The area of the fabric in contact with the cylinders is subjected to a high velocity, turbulent, stream of air.

DYEING AND PRINTING E

Acetate rayon prints

Sandoz, Ltd., A. Wiazmitinow, and H. Goorhuis. Brit. P. 665,660. *Dyer 107*, 433 (Mar. 21, 1952).

The process for printing acetate rayon with water soluble acid dyes, described in Brit. P. 661,800, is said to give dyeings and printings on cellulose esters and ethers, using basic, substantive and mordant dyes which are fast to soaping in place of the acid dyes, without subjecting the dyed and printed material to steaming. The products used for dye fixation are a salt of thiocyanic acid, urea, thiourea or guanidine as a swelling agent, a volatile aliphatic carboxylic acid and an aliphatic hydroxylated compound, besides the usual diluting and extending agents.

Agents against gas fading

I. C. I., Ltd., W. Todd, D. G. Wilkinson, and H. Worsley. Brit. P. 664,079. *Dyer 107*, 261 (Feb. 22, 1952).

A gas fading inhibitor is claimed and is said to possess good affinity for cellulose acetate, low volatility, good fastness to washing and dry cleaning, and to show much less color change on exposure to gas fumes or light than other substances that have equally good effectiveness, affinity, and fastness properties. The compound is N:N′:N″ triphenylguanidine, the melting point of which (145°C) is higher than the temperatures used in dyeing processes and which can be read by converted into a dispersible powder which does not melt in the dyebath.

Agents against gas-fading

British Celanese Ltd. Brit. P. 664, 204. *Dyer 107*, 261 (Feb. 22, 1952).

The gas fading on cellulose acetate fabrics dyed with dyes of the aminoanthraquinone series is claimed to be greatly inhibited by means of a compound of the general formula:

where R is hydrogen, alkyl or aryl, R_1 is aryl or aralkyl, R_2 is aryl or aralkyl and X is an alkylene radical of at least 2 carbon atoms. A typical compound of this kind, which is particularly useful is 1, 3-diphenyl-imidazolidine. Preparation of this compound is described.

Better, more economical dyeing of synthetics reported

A. P. Roy. America's Textile Reptr. 66, 75-6 (Apr. 3, 1952).

Extracts of the paper, "New Developments in the Dyeing of Synthetic Fibers", presented by the mid-west section during the last annual meeting of the AATCC, are given. The characteristics of the newer fibers such as nylon, orlon, dacron, vicara, and saran fibers are discussed together with the newer methods of dyeing of these fibers.

Colouring hides and skins

Concerie Alta Italia di Girando Ammendala and Pepino. Brit. P. 664,059. *Dyer 107*, 340 (Mar. 7, 1952).

Continuous automatic machinery for coloring hides and skins consists of sprayers carried by carriages which perform a reciprocating movement on guides perpendicular to the direction of movement of an endless wire mesh in which the skins are fixed. A valve supplying compressed air to the sprayers is actuated by an electro-magnet carried by each sprayer, energized in such a way as to open the valve only when the sprayer faces the hide. When the sprayer faces the mesh, the valve is closed, avoiding waste of dye. The electro-magnets of each sprayer are operated by a photo electric cell device comprising a projector which emits a beam of light on the mesh and a mirror behind the mesh for reflecting the beam of light on to a photo electric cell. Impressions received by the cell are recorded on a repeating device, preferably a punched paper strip, and the record is used to operate the sprayer pistols only when the hide comes in front of each sprayer. A tunnel is arranged after the last sprayer for final drying.

Continuous azo dyeing and printing

General Aniline & Film Corp. and C. Streck. Brit. P. 665,587. *Dyer 107*, 436 (Mar. 21, 1952).

A method of continuous dyeing and printing cellulosic materials with azo dyes consists of passing the material through a bath containing an azo coupling component, followed by application of diazo component by printing or by impregnation in a second bath, and causing the diazo component to couple with the coupling component on the fiber. Variation in shade is claimed to be avoided by bathing the material, after coupling is completed, with a mineral acid of sufficiently strong acidity to remove alkali metal bound by the dye on the fiber.

Device to measure color developed by Hatboro firm

Anon. *Daily News Record*, 31 (May 5, 1952).

See front section.

Dispersed dyestuffs for printing on acetate

J. W. Batty, R. W. Hardacre, S. W. Milne, and I. C. I. Brit. P. 664,646. *Dyer 107*, 341 (Mar. 7, 1952).

Much brighter shades are said to be obtained in the printing of cellulose acetate and nylon fabrics with dispersed, water insoluble dyes by the addition to the printing paste of a condensation product of ricinoleic acid, or bodied ricinoleic acid, with ethylene oxide.

Dyeing cellulose textiles

Henri Riat, Walter Anderau, Jacques Wegmann, Hans Mayer & Karl Menzi (to Ciba Ltd.) USP 2,594,521, Apr. 25, 1952.

A process of dyeing cellulose textiles with difficulty water-soluble copper compounds of dyestuffs by using a dyebath containing a copper-free dyestuff forming the basis for the copper compound, a water-soluble amine, and a complex copper compound of an aliphatic hydroxy-carboxylic acid.

Dyeing X-51 acrylic fiber

A. L. Peiker. *America's Textile Reptr. 66*, 75, 77, 80 (Mar. 20, 1952).

Both the staple and continuous filament forms of the new X-51 acrylic fiber can be easily dyed in a full range of colors with excellent fastness and with vat dyes giving especially good results. Dyeing of both the staple and continuous filament is possible with acetate, acid and direct, basic, vat, and soluble vat dyes with the principal difference in the dyeing properties of the two forms being in the depth of shade obtainable. The procedures for dyeing X-51 acrylic fiber with

the different classes of dyes, based almost entirely on laboratory studies, are described.

Experiments in union dyeing

Esmee Smith. *Dyer 107,* 365 (Mar. 7, 1952).

In dyeing wool-nylon blends with acid or acid milling dyes, chrome complex and chrome dyes, it is necessary to know how the dyes behave individually and in combination in different depths of shade and to have some means of controlling the depth of shade on nylon as compared with that on wool. Nylon is dyed to a fuller shade than wool in dyeing pale shades on nylon-wool blends, and it has been found that by blocking the amine and groups of nylon some of the dye is kept from the nylon and dyed on the wool. Experiments with compounds such as Colsolene Oil HS for blocking the amine end groups of nylon are described.

Gas fading

V. S. Salvin, W. D. Paist & W. J. Myles. *Amer. Dyestuff Reptr. 41,* P297-302 (May 12, 1952).

This paper describes the phenomenon of gas fading and discusses the mechanism of the reaction in relation to the nature of the fabrics, as well as the use of newer dyes and inhibitors. The gas fading of dyed acetate fabrics is due to nitrogen dioxide, which is absorbed from the atmosphere. This gas is very soluble in cellulose acetate but does not react with the fiber to any extensive degree. The acetyl value of the fiber, as well as its moisture content, has a marked effect on the rate of gas fading. It is found that the rate of gas fading can be correlated with dye structure.

Hose finishing machine

British Schuster Co., Ltd., E. Freysz and L. Heldmaier. Brit. P. 644,217. *Dyer 107,* 262 (Feb. 22, 1952).

A hosiery finishing machine is claimed which may be adapted to finishing silk and rayon hosiery and to the shorter time required for finishing nylon hosiery. An endless conveyor, carrying forms for the stockings, is arranged so that over the main part of its run the two parts of the conveyor lie parallel to one another. A loading station where the hosiery are placed on the forms is near the end of one straight run of the conveyor. After moving around the end of the run, the hosiery pass through a spray box where they are impregnated with steam, hot or cold water, or an anti-snag compound. They then pass through a pair of rollers, which remove excess liquid, and through a finishing chamber, where

they are conditioned. The chamber length in nylon finishing is less than that in silk or rayon finishing. The stockings then pass to a stripping station, and the forms go on to a further loading station so that the finishing operation is repeated on the other straight run of the conveyor.

Hunter open with dye kettle

Anon. *America's Textile Reptr. 66,* 35 (Apr. 10, 1952).

A new open width piece dye kettle for dyeing pile fabrics and other face finish goods in open width plus other types of goods in rope form has a unique triangular reed with three tilting bars for supporting the goods. Other features include: safety-type enclosure doors, a bakelite spreader bar to keep out wrinkles, a built-in pin guide rail for goods in rope form, etc. Mfr.: James Hunter Machine Co.

Lacquer-in-water emulsions

Interchemical Corp. Brit. P. 663,824. *Dyer 107,* 264 (Feb. 22, 1952).

Lacquer-in-water dyeing emulsions, using resin binders, contain a pigment dispersed in the aqueous phase instead of in the lacquer phase, and the aqueous phase contains a water-soluble bodying agent. The system is said to be stabilized against flocculation of the pigment, and the pigment is said to be as permanently attached to the fabric after drying and setting of the binder as when a pigmented lacquer is used.

The Marhen Process

Donald E. Marnon. *Amer. Dyestuff Reptr. 41,* P292-96 (May 12, 1952).

The Marhen Process is based on the tendency of a reducing solution, such as a bath of hydrosulfite and caustic soda, to give up electrons. When a bright platinum electrode is placed in the bath, the electrons tends to escape from the solution at the electrode with a certain electrical pressure, or voltage. To measure this tendency electrically a double connection is always necessary, and therefore a connection is made to the solution both through the platinum electrode and through a saturated calomel/potassium-chloride electrode, which has a fixed and known temperature. The Marhen apparatus measures, in a reliable and reproducible way, the voltage between these two electrodes, which then differs from the true redox potential of the bath by a known amount.

Measuring the pH

T. Green. *Dyer 107,* 257-8 (Feb. 22, 1952).

The two chief methods of measuring pH,

which are reviewed, include the colormetric method, or the use of dyes known to change color at a definite pH, and the use of a glass electrode pH meter. The colormetric methods are convenient and quick but are of no value with highly colored solutions. In addition, some commonly used processing chemicals destroy the dyestuff indicators. Examples of the use of pH in the dyehouse are cited.

Modern hose dyeing

G. E. Wood. *Dyer 107*, 334-5 (Mar. 7, 1952).

Notes are presented on the dyeing and finishing of cotton, rayon, silk, nylon, and Perlon hosiery.

Nylon back grays

Eddystone Manufacturing Co. and F. Bromley. Brit. P. 604,313. *Dyer 107*, 341 (Mar. 7, 1952).

Uniform prints at all times on light and heavy fabrics may be obtained by using a nylon back grey, and the size of the washing device and the number of dry cans are said to be reduced from what is required for cotton back greys. Preferably, the nylon fabric has a 60 x 42 count, weight 6.4 ozs. per sq. yd. and is made of substantially 210 denier nylon, 2-ply both warp and filling. This construction is used for both 47 and 57 inch widths. The fabric is cured before being put into use by heating to a temperature at least equal to the temperature to which it is subjected on the drying cans when in use.

Rise and fall of Turkey red

Robert Peel. *Dyer 107*, 329-30 (Mar. 7, 1952).

The rise and fall of the Turkey red dyeing industry in Scotland is briefly traced.

Stabilizing tricot fabrics

Am. Viscose Corp. Brit. P. 664,612. *Dyer 107*, 341-2 (Mar. 7, 1952).

Curling of tricot knit fabric selvedges and the development of wrinkles or crow's feet in thermoplastic fabrics during treatment may be avoided by treating the fabric with a heated liquid which has a slight swelling action only on the yarns and is below the temperature at which, if the yarns are thermoplastic, they undergo any appreciable softening. Water of about 100°C. is preferred for cellulose acetate yarns, not plasticized; and if the acetate yarns are plasticized, the temperature is adjusted substantially below the softening point for the plasticized yarns. Water may also be used in treating fabrics of other thermoplastic materials. For regenerated cellulose yarns, a heated aqueous sodium hydroxide solu-

tion of a concentration below that at which any substantial degradation of cellulose is effected is preferred.

One of the various types of apparatus that may be used consists of a vessel containing water at about 100°C with a pair of endless bands, travelling around pulleys, below the level of the water. The bands are spaced to permit passage of the fabric between them but insufficiently to permit curling of the selvedges. A wire bent to trapeze shape is the uncurling means. The fabric is thus stabilized in flat, smooth condition and withdrawn from the vessel over a guide roll by a pair of rolls. The fabric may then be colled by passing through a vessel containing cold water, or by a stream of cold air as it passes over the guide roll.

Standfast dyeing machine

Standfast Dyers and Printers'. Brit. P. 665,456, *Dyer 107*, 433 (Mar. 21, 1952).

Accurate and continuous temperature of the treating liquor in the molten metal dyeing machine must be maintained to prevent solid particles of metal forming and interfering with uniform application of the liquor to the material, and also to avoid prolonged heating which leads to sludge formation. This temperature control is accomplished by keeping the volume of treating liquor on top of the metal bath at a comparatively small volume, and continuously replenishing the bath with fresh heated liquor so that variations in temperature, volume and strength sufficient to affect the process adversely are avoided. An automatic means of feeding the dye liquor operated by the rise and fall of the level of the bath is also described.

Successful working of fully automatic screen printing machine

Anon. *Dyer 107*, 413-14 (Mar. 21, 1952).

A new 4-color fully automatic screen printing machine, produced by Belfast Silk & Rayon, Ltd., is said to be easy to operate, simple in design, and cheap to manufacture. Cloth is gummed to a rubber conveyor belt and carried over the printing sections where color is applied by mechanized squeezes. Color feed can be by hand or from tanks; and the machine is designed to give a range of three selected repeats. The quality of work has been found to be more constant and higher than normal screen printing with longer life obtained from screens which are the standard type and are interchangeable.

7

SPECIAL REPO

How Textile Research Pays Off

"THE QUESTION OF WHETHER TEXTILE RESEARCH PAYS OFF has received a forceful answer during the past year," according to Dr. Jack Compton, Technical Director of Research at the Institute of of Textile Technology in Charlottesville, Va.

The answer? Textile research pays off so well that more and more textile mills are buying it. Or, in the words of Dr. Compton, "More mills continue to invest in textile research at the Institute despite the fact that the industry has been bogged down in one of the worst depressions since the Thirties; and the practical results of textile research here and in other research centers not only fathers mill modernization programs but also develops better uses of existing equipment, better quality, and lower costs."

The fact that there are three new mill members of the Institute points to the accuracy of that appraisal. These new members are important mill groups, such as Smyre Manufacturing Company of Gastonia, N. C., Standard-Coosa-Thatcher, Inc., of Chattanooga, Tenn., and Cross Cotton Mills of Marion, N. C.

From the experience of ITT, what do the highly progressive mill member groups receive from textile research at the Institute?

Dr. J. L. Vaughan, ITT president, answers this question as follows, "The layman sometimes thinks that long-term research represents the full effort of the textile scientist to better his industry. While we are engaged in long-term research we are also constantly mindful of the mill man's problems. The long term research is insurance for the future, the trouble shooting meets the immediate need. Dr. Compton's staff plunges into the pressing everyday production problems of our member mills. Eighty three service jobs were done the last quarter on member mills' individual problems."

What are some of these problems handled by textile research men?

"The most widely publicized one was the work our staff did on Tar Spots," Dr. Compton said.

"This work originated as an individual mill service job and led to a discovery of a method by which tar spots can be removed from cotton goods by a kier process at a fraction of a cent per yard, or by a hand spotting method."

Recently, the kier method was used to save thousands of yards of cotton goods owned by an ITT member mill. The goods were being processed at a South Carolina bleachery when the tar spot contamination was discovered.

The bleachery called the mill. The mill management called the Institute, and a staff technician was dispatched to South Carolina to introduce a newly developed method to remove the tar spots. The removal was successful, and the goods were saved from classification as seconds.

But how about mill processing problems, Dr. Compton was asked. How does the Institute research aid mills on those problems?

"We study methods of using materials and equipment better," he said. "For example, we were shipped six samples of cotton by a member mill, and we were asked to blend the various raw stocks for medium-to-fine counts, then to select the cheapest blend for the mill to run, and one with a good color value on the automatic cotton Colorimeter."

"Fiber, color, and trash-content tests were made on the cottons. The staff selected the cheapest sample of cotton, in terms of quality requirements, based on the cost per pound of card sliver from twenty three different blends of the samples. The mill received these results and was able to effect some savings by better blending, the exact amount of savings we were unable to determine since we did not have the figures on the pounds produced from this particular blend."

Blending of cotton by Micronaire readings was also an ITT-recommended innovation. A large 100,000-spindle mill in South Carolina now blends by the Micronaire or fineness readings, with beneficial production results in fewer ends down in spinning and better quality of yarn.

The mill management itself recently described the results of the research as follows,

"The operating results were chartered for weekly card nep counts on 100 sq. in. of web for the 1949 cotton crop season — in which we did not blend by fineness— and for the 1950 season, in which we did blend by fineness. The nep count varied from 25 to 54 for the 1949 cotton, and from 35 to 39 for the 1950 cotton. Our product was correspondingly more uniform after we blended by fineness than before. We also no-

ticed little variation in ends down throughout the running of the fineness blended crop, whereas in 1949 we had the proverbial good and bad days in the running of the work."

Another service function of ITT concerns testing procedures. A large group of combed yarn mills was able to use the ITT standard testing program with the following results: non-uniformity of card sliver was reduced from 17 to 11 percent; non-uniformity of combed sliver from 36 to 22 percent; non-uniformity of drawing sliver from 26 to 14 percent; non-uniformity of roving from 46 to 28 percent; and non-uniformity of yarn from 109 to 75 percent.

These examples of short term research merely point up the type of everyday production "trouble shooting" that the textile scientist is called upon to help solve. But what about the scientist's long suit — the so-called long-term research? Does it pay as well as the trouble-shooting projects? Or, is long-term research an "ill defined and indiscriminate swapping of molecules in a vacuum," as one popular analyst once described it.

Here again, the evidence at the Institute of Textile Technology indicates that the textile mills are getting the type of research they require.

As Dr. Compton phrased it, "Our program, you know, is actually controlled and scheduled by the Institute's Technical Advisory Committee, which is made up of sixteen outstanding mill production and technical men. These men know the industry. And they know what they want in regard to long-term research. Take, for example, the problem of uniformity of textile products."

"We began in 1947, under the able leadership of Dr. E. J. Bernet, to investigate various types of instruments to measure irregularity in yarn, roving, and sliver. Today, our Physics Section has a Uniformity Analyzer which is being marketed widely by the Brush Development Company. In addition, we have several auxiliary instruments which simply will be plugged into the Analyzer."

Thus, ITT's attack upon Uniformity is a broad one that is designed to continue so that the mills' measurement and control of uniformity may be as thorough as possible. Newest wrinkle among the Institute's electronic instruments is the Imperfection Counter, commonly called the Nep Counter. This instrument counts imperfections in yarn at high speeds and will be supplied to the mill members. There is also an electronic Lap Meter which has been used extensively in analyses of member mill's picker laps, but which is still in the development stage as far as marketing is concerned.

In development, too, is the cotton cleaner, a machine recently described by the Wall Street Journal as having unusual cleaning ability. Does work on this machine mean that the Institute intends to attempt a push button revolution of textile processing? And, as hinted in some of the press, is the cleaner ready to supplant a complete line of opening equipment?

"No — to both questions," Dr. Compton and Dr. Vaughan reply. "Our research is not aimed at taking over the job of producing textile machinery. The work on the cleaner is simply an off-shoot of our extensive research in Physics and Mechanical Engineering. It is still in test stage only, and we do not know just what its contribution would be on the production line of a mill. If such a project as the cleaner pays off, it should be attributed largely to the thoroughness of the research program in general."

All of which means, that textile research on a broad scale has proven its worth, as far as the Institute is concerned. The research program, now under the management of many able mill men as well as scientists and technicians, has produced valuable assets which can be classified as follows:

(1) Short-term research, or "trouble shooting," on a mill's individual problem.

(2) Long-range research of overall benefit to the entire mill membership.

With those past accomplishments at ITT in mind, it appears logical to assume that a review of the present research program at ITT might throw some light on the contribution that textile research at this institution may make to mill modernization programs of tomorrow. Here, then, for the first time for outside publication, is a condensation of present or recently completed research studies at the Institute of Textile Technology:

Precision measurement of uniformity and other factors of textile quality, including electronic instruments to measure uniformity of sliver, roving, and yarn.

Accumulation of data from many varied textile mill sources on uniformity and other factors of textile quality.

Studies on warmth of clothing; the use of ultrasonic vibration for improved dye or size penetration; the electrostatic charging of cotton during processing; the relation of physical fiber properties to processing performance; the relationship between spinning conditions and yarn quality.

Research on the opening and cleaning of raw cotton; the development of a yarn imperfection counter.

Rapid methods for determining the nep-forming qualities of baled cotton; causes of streaks in dyed fabrics; reasons for unsatisfactory spinning characteristics of some cotton fibers.

Sources of tar spots in finished cotton fabrics and methods of removal.

Twist setting of filling yarn by surfactant solutions and vapors of various materials; chemical modification of cotton fiber to immunize it permanently to mildew attack and to increase its resistance to heat damage without change in color or odor, and with little change in strength, hand, and dyeing properties.

Treatments to make cotton fabrics resistant to soiling and easier to wash clean after soiling, including methods which can be applied in home or commercial laundries, as well as in textile mills.

Development of more satisfactory methods for the dry cleaning of cotton fibers; the mechanism of soiling and soil retention of cotton and other textile fibers.

More efficient drying systems for slashing; a cloth inspection machine to provide a stationary image of moving cloth; modification of long-draft spinning to produce more uniform yarns.

Development of testing instruments to measure yarn stiffness; single-fiber stiffness, fiber drag, the water absorbency of fabrics, as well as improvements on several of the standard testing machines.

Experiments in weaving at controlled humidities; determination of machinery precision tolerances; tests for locating "poor performance" spindles; yarn-strength prediction formulas.

Article by Mal Bowden, Editor of the *Digest*, as it appeared in the June 2nd, 1952, issue of its *Daily News Record*, page 16.)

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Technical Highlights of the Month

NEW PICKING AND SHUTTLE CONTROL MOTION

After ten years of experimenting with various types of picking motions, W. G. Trautvetter of Paterson, N. J. has now been granted U. S. Patent # 2,564,,383 on a spring propelled picker stick and shuttle control motion which permits loom speeds up to 300 picks per minute while reducing both vibration and noise. The new motion may be seen in operation at Mr. Trautvetter's shop at 262 Totowa Ave. in Paterson.

The cone picking motion of the modern loom consists of a cam which rotates with the cam shaft and actuates a ball or cone that is fastened to a picking shaft, picking arm, lug straps, picker stick and picker. The movement of the shuttle is controlled by a parallel motion at the base of the picker stick, by a check strap and by suitable binders or swells at the shuttle box.

Even with the most accurate adjustments, the cone picking motion imparts a hard, jerky motion to the loom, and all parts of the picking mechanism are subjected to exceptionally fast wear and frequent breakage.

Because of the intermittent movement of the shuttle and of the picking mechanism, it is necessary to have a heavy motor equipped with friction plates and clutches to take the thrust and pressure of sudden and quick starts.

Mr. Trautvetter's new motion eliminates these objectionable features. There are no picking cams with their noise and oil splatter; no parallel motions with their difficult adjustments; and no longer are the check straps and swell's required for the braking of incoming shuttles.

The new picking and shuttle control motion is powered by a crank arm on each side of the loom. Motion from the cam shaft actuates the crank arm which, in turn, drives a lever mechanism with an upward and downward movement. The downward movement pushes the picker stick back into its loaded position and locks it with a catch. The upward movement releases the catch, and a long coil spring pushes the shuttle smoothly out of the box and through the shed to the opposite side of the loom where the operation is repeated.

A new pivot rod controls the braking of the incoming shuttle. Elimination of the swells provides a straight runway at all times for the passage of the shuttle. The shuttle is locked in the box at the end of each pick and for the transfer of a full quill. When the lock is released, however, the shuttle may be pushed from the box by a finger.

It is claimed that 40" looms will operate at a speed of 300 picks per minute with the spring and latch type of picking mechanism. Adjustments can be made for heavier or lighter picks and for earlier or later timing. The simplicity of the mechanism and the ease of operation result in higher speeds; lower cost of upkeep because of fewer parts and less breakage; and better efficiency due to lowered vibration and noise. (*Rayon & Synthetic Textiles*, May, 1952.)

"THE GREAT ADVENTURE OF FIBER STRUCTURE"

Giving the annual Mather Lecture at the 1952 Textile Institute annual meeting, Prof. W. T. Astbury, M.A., ScD., F.R.S. (Leeds University), said the adventure of fiber structure was one of the great, comprehensive stories of the century. It was a co-operative effort of biology, technology, physics, chemistry and medicine, and touched on the interests of almost everyone. Essentially it was the science of chain-molecules, based on lessons learnt from, more than anything else, the structure of living tissues.

The most important and most persistently exciting theme running through the science and technology of fibers was that of molecular chain-folding and the interpretation of elastic properties. It reached its highest manifestation in the proteins, in which in fact it was first discovered—as a result of X-ray diffraction studies of wool and similar animal hairs. From that time a series of logical developments led finally to the fundamental theory of regenerated protein fibers and the scientific manufacture of products such as "Ardil." Present-day understanding of protein fibers, both natural and regenerated, was a kind of cyclic achievement. Starting out from wool, it progressed through typical crystalline proteins, such as egg albumin, haemogoblin, edestin and the like, and the recognition of the basic intramolecular relation between them and the fibrous proteins, then came back to wool again with not unworthy copies made from nut and beans and milk.

In a similar connection, because the proteins were the chief and indispensable constituents of all vital activity, the question of the detailed structure of wool and related fibers had nowadays assumed even more imposing proportions

in the academic world than in the technological. This fiber, once considered "dead" and uninformative, had now become the very life of protein studies and the clue to all sorts of fundamental advances. Especially had it pointed the way to how human muscles worked. Most recently, the problem had also been attacked from the purely synthetic side. Certain simpler "polypeptide chains" (the essential components of all proteins) had now been built up in the laboratory and drawn into fibers, with results that were already proving most valuable.

As yet, however, only the simplest aspects of how fibers are formed in nature had been glimpsed. The problem of biogenesis remained supreme and unsolved, but they were turning to it again with all the inspiration of the new-found fiber science. and with the help of many new techniques, such as that of electron microscopy. The biogenesis of cellulose was once more receiving particular attention, and above all an intense interest was developing in the collagen fibers.

Perhaps the most exciting episode of all in this great adventure of fiber structure was the discovery by X-ray analysis of the structure of bacterial fiagella. These incredibly minute, whip-like appendages by which many bacteria propel themselves were now seen to be single molecules—and molecules, moreover, of the type of animal hairs and muscles. Endowed with the power of rhythmic movement, they seemed to be the simplest possible example and "bed-rock" of all that was being sought in the inseparable studies of textile elasticity and biological mobility, and especially muscular activity. They were threads only one two-millionth of an inch thick, but they were an embodiment of all the elastic essentials of the wool fiber, from which, let it be said again, the adventure first set out. *Textile Weekly*, 1338, May 16, 1952.

MILLS CAN NOW MEASURE ROLL WEIGHTING ACCURATELY

A direct weight-measuring device for both lever- and spring-weighted systems has been developed by Dixon Lubricating Saddle Co., Bristol, R. I. The device can be used on both roving and spinning frames, although it was designed specifically for spinning.

The weight measurer can be used on any spinning frame that has a front and back bottom steel roll; it fits on the frame by clamping each end to the bottom steel rolls. Two saddles and two sets of top rolls must be removed before installation, and the frame must be stopped.

To determine the roll weighting needed, the device is placed under the end gudgeons of the top rolls and the spring scale is screwed up until tissue paper can barely be drawn from the bite of the top and bottom rolls. The scale reading gives the weight applied.

The scale can be slid from back to front on its support; so weighting can be measured for any top-roll position without resetting the whole instrument. It is easy to move the weight measurer from frame to frame without disassembling. All parts, except the square cross bars, are made of aluminum so that a girl can carry it from one frame to another.

Weights can be checked from frame to frame, or from spinning room to spinning room. Lever and spring weighting systems can be compared. For best results, all systems should be checked at least annually to see if delivered weights have changed due to wear on the weight-multiplying members. *Textile World*, 102, June 1952.

SYNTHETIC FIBER YARN MANUFACTURING DISCUSSED BY SOUTH CAROLINA S. T. A.

Synthetics might be divided or classified first by composition. In other words, there is a class of fibers that start with cellulose. That is the early type; and in that group you will find viscose, acetate, and cuprammonium. They are the three main fibers that start with cellulose as a base. Next come the true synthetics, which are fibers built up right from the ground, from an inorganic material combined with an organic material. In that class are Orlon, nylon, Dacron, Dynel and other fibers. They have entirely different properties, and they handle quite differently in the spinning and in the final yarn. In them you have a material quite different from that early type of synthetic which had a cellulose base.

The classification can be carried further. In synthetics you had at first 1½-inch staple and 1½-denier. I imagine the synthetic fiber was cut in that staple and made in that denier in an effort to approach the condition you had in the cotton fiber. To get the stuff on the market the producer had to put it in such form that you cotton pioneers wanted a little wider field in the construction of fabrics, and they put on pressure to get longer lengths. Then, after more time, it was found that coarser fibers were very desirable in giving the fabric a better hand and a crisper feeling. So, over a period of six or eight years, the trend was toward a fiber up to three inches in length and running in denier to three, 3½, and even to 4½.

As time went on the tendency was to go to even longer fibers. Some of the spinners now want fibers at least four inches long and in coarser deniers, some even up to 11-denier. By

using longer and coarser fibers the manufacturers find it possible to produce fabrics much like worsted, by using up to 4½-denier. If you want more crispness, still more resistance to creasing and resistance to wrinkling, you go to even coarser deniers. The entire reasoning back of this whole thing was to produce fibers that had qualities in the worsted field. In other words, a good deal of Summer suiting is now made of synthetics, and in order to get appearance and wearability it was necessary to go to these longer lengths.

That is the trend at the moment. It might now be well to take a little time to go over the matter of handling. The shorter lengths you can handle on your cotton machinery; for the longer lengths you need to modify that machinery. You need longer roll stands, so that you can spread your rolls, and larger rolls—you need rolls of such dimensions that you can increase the weight. As we go on with these newer systems, where more control is put in the unit of the machine itself, you have a second reason for applying more weight to the top roll. So a separate type of machine has been developed to handle this longer coarser fiber. Since it approaches wool in many of its characteristics we find that the worsted type of machinery, that we have been building over a period of years, fits in very nicely. It is true that we have made modifications in its set-up and in its operation, but we have taken a number of features from the old type of worsted machinery. For instance, we have the larger roll. As a result we have today what our company calls an American system, and on that we can handle these newer types of fibers that run into the long lengths and coarser deniers suitable for the worsted-type fabrics.

It is true that as you get into these longer lengths some of your problems become quite difficult. One of them is the preparation of the lap. At the present moment it is difficult to make a good lap on a picker with a staple of over 3½ inches.

In place of drawing, on these longer lengths we substitute a process similar to the old process which was used in worsted, where you have pin control, which controls the material as it is carried forward; and then that is pulled out.

When it comes to roving, you can overcome the difficulty there by using longer roll stands and larger rolls. That prevents lapping and licking of the fiber and makes the ordinary operation of the machine much easier; and, at the same time, you can add the pressure that is necessary to do proper drafting. The same thing applies to spinning. Our machines are heavier in construction; we use a two-inch bottom roll in spinning, just as we do in roving; and then we apply the improved method of draft control that we get by the use of aprons.

That covers roughly the trend at the moment and some of the problems that we have overcome. There are still other problems; and maybe, as time goes on, they will surely be solved. But at the present time fabrics are being constructed in the field of synthetics that offer good, stiff competition with these higher-quality worsted fabrics with which we are all familiar. The reason that has led to the adoption of this new type of machinery is the development of machinery to fit the product that you obtain to make and the stock that you are running. I still think we are in the molding stage; I think there will be a lot of progress made with the newer types of fibers, particularly those of the Dacron and Orlon type. They fit in very nicely with combinations of woolens and worsteds. They have certain virtues that the woolen fiber itself does not have; and, when blended in the proper proportion, I think it is possible to construct fabrics that are better than we make of the natural fiber. It will be a long time, I think, before synthetics replace some of the natural fibers; but there is a definite field for them, and when properly used they will prepare and produce materials that are of superior quality. I think as time goes on we shall find more and more synthetics in use, both as self fibers in 100 per cent use and also in combination with out natural fibers. (*Textile Bulletin*, 63, 64, 65 (May, 1952)

SLASHING SYNTHETIC FIBERS

In achieving the goal of a well sized synthetic warp two problems exist which are (1) the choice of the proper starch base material and sizing adjuncts to supply abrasion resistance requirements of the specific weave and to be readily removable from the woven fabrics (2) proper physical handling and application of the sizing materials in the slasher room to provide the optimum amount and distribution of size on the yarn.

There has been developed an entirely new series of starch base products for sizing with the chemical description of hydroxyl alkyl starch ether gums. This series of products has the properties of low congealing, stable viscosity, high film strength, strong adhesion and much improved removal in desizing with upwards of 95 per cent being removed without benefit of enzyme treatment by a good scouring in the finishing plant. Enzymes attack the starch ether gums much more readily than usual starch base products which greatly facilitates complete removal of the sizing when the fabric is subjected to the

normal enzyme treatment in the routine finishing plant processes for spun synthetic fiber fabrics.

Experience has indicated that the minimum amount of size that provides adequate weaving protection for a given warp will yield the best quality synthetic fiber fabric. To secure the minimum amount of size for the weaving requirements of the specific weave it is necessary to balance the viscosity characteristics with the concentration of the starch base materials to supply a size box viscosity resulting in the proper deposition of the size in, and on, the yarn under the individual mill slashing conditions. Under normal conditions light sizings provide more efficient weaving protection when applied from viscous sizing materials in comparison to less viscous products.

In the range of 5 to 8 per cent added weight on synthetic fiber yarn the viscous sizings provide greater abrasion resistance than 5 to 8 per cent added weight from thinner bodied sizings. For warps requiring added weights in the range 8 to 14 per cent or higher, it is mandatory to use the thinner boiled products in order to achieve a working size box viscosity with the higher concentrations of starch base materials which are required to produce the added weight necessary for adequate weaving protection on higher count constructions.

Should the higher added weights be applied from extremely viscous sizings, excessive coating of the yarn is sure to result, accompanied with breakouts at the front of the slasher, abnormal shedding of fiber both at the slasher and loom, increased loom stops due to knots and gouts breaking out and increased prominence of set marks. An optimum size box viscosity exists for each weaving requirement to utilize the maximum efficiency from the various percentages of added weight on the sized warps.

The slashing of the newer synthetic fibers which fall in the general classification of hydrophobic materials (Nylon, Orlon, Acrilan, Dynel, Dacron) pose a challenge to both the textile and the size manufacturer with the paramount problem of getting a sizing to adhere to the yarn and offer sufficient weaving protection to facilitate the passage of the yarn through the loom. As a class, these moisture hating fibers absorb only a negligible amount of water which means that in slashing the size is held in and on the yarn in the wet state entirely on the basis of the viscosity and/or filming properties of the sizing. A crude analogy of sizing the hydrophobic fibers is that of painting a glass rod in that a thin paint containing a high proportion of solvent fails to cover the rod while a heavy bodied paint containing an ample amount of oil or resin and pigment leaves a heavy protective film. In sizing the solvent can be compared to water and the oil or resin and pigment to the starch base product and sizing adjuncts.

A satisfactory sizing for the fibers having low moisture absorption capacity must possess strong adhesion to the fiber and sufficient elasticity to the dried state to prevent the film from shattering when these very elastic fibers are stretched. The characteristics of the more fluid of the hydroxyl alkyl starch ether gum series have been particularly adaptable for sizing these fibers in conjunction with polyvinyl alcohol and wax. Mill experience has shown that relatively high concentrations (125 to 175 pounds per 100 gallons) of the starch ether gums containing 25% polyvinyl alcohol and 5% high melting point waxes (percentages based on the weight of the starch ether gums) serves as a mill production size for fibers of this type.

In the sizing of the more difficult weaves with singles yarn composed of 100% fibers of the classification added weights of 15 to 20% have been secured in order to provide adequate weaving protection and eliminate clinging. Added weights in this range of sizings composed of the starch ether gums polyvinyl alcohol and wax appear to have licked the characteristics rugged clinging in the shedding motion of 100% dynel warps.

In the sizing of synthetic fibers hard size can be classified according to the two general sources of (1) roll marks and (2) individual hard size spots.

Roll marks occur at a point on the warp yarn at which the squeeze rolls rest during the period that a slasher is stopped for leasing or doffing of the warp. The degree of the hard size roll mark varies with the time the slasher is stopped, congealing properties, concentration and viscosity of the starch base product.

From a mechanical standpoint an educational program of speeding up the operators to the point that the time the slasher stands reduced to a minimum through improving the efficiency of running lease strings, cutting laps, doffing and other operations will materially reduce the intensity of the roll marks. Slasher operators that have become creep-speed conscious, by punching the creep-speed button to move the yarn a short distance as often as possible, can materially reduce roll marks.

In some instances running too low a level of size in the size box will contribute to the formation of roll marks. Personal experience has shown that for most sizing conditions a size level midway on the copper or stainless steel roll pro-

vides best results. Too viscous a size mix also increases the tendency towards hard size roll marks. The obvious solution is to use a thinner bodied starch base product.

Sizing containing starch base products that congeal easily greatly increases the number and the degree of roll marks. Prior to recent times no relief was possible from the innate congealing properties of the starch base product used in spun synthetic sizings; however, the development of the new starches such as the hydroxy alkyl starch ether gums has made available products for sizing application that physically will not congeal into a hard gel structure even when the cooked product is cooled to room temperature. A product of this type, when properly handled, virtually eliminates the formation of roll marks.

Individual hard size spots other than roll marks on the yarn usually result from one or more causes such as insufficient mixing of the sizing materials in the cooking kettle prior to turning on the steam; poor housekeeping in the cooking kettles, storage kettles, and size boxes; too low a temperature in storage kettles and size boxes; too high a size level and excessive variation in size level; too vigorous boiling of size in the size box due to faulty size box coils; too high steam pressure to size box coils; failure to keep the size level above the closed steam coils in the storage kettle; secondary effect of foaming; dead spots on unheated portions of size in the size box; choice of a starch base sizing material that possesses the inherent adverse physical property of congealing. The same proportions that make the newly developed starch ether gums so desirable in eliminating roll marks are effective in reducing the individual hard size spots resulting from the outlined causes of hard size from mechanical application. (*Textile Age*, Page 26-27, June 1952)

THIS MILL KNOWS WHY

Even though Thor Mills Ltd. of Granby, Que., which processes nylon knitting yarns, installed its Ericsson Centralograph machine-stoppage recording system just six months ago, it has already been able to give the mill a 17½% increase in spinning production per week. Centralograph has a telephone-like dial attached to the head end of processing machinery which allows both frame hands and fixers to go on record as to why their machines were not running at a particular time. The device has won acceptance by both frame hands and fixers as a fair-enough system that would put only a "loafer" in a bad light.

Componently speaking, the Centralograph recording system, which tells why mill machinery is stopped at any time, consists of a recording instrument, a rectifier (battery charger), two wet-cell batteries, a condenser, telephone cable, and rotary contacts and dials for each of up to 20 machines that can be tied into the unit. Thor Mills has three frames connected to the system so far.

At Granby, the dials and rotary contacts were installed on the Bradford reducer and McGlynn-Hays spinning frames by the mill maintenance crew. The tying in of the rotary contacts to the telephone cable and the printing units on the office recorder was done by an outside electrician. The other parts of the system were easily connected at the time of installation of the recording panel in the office of the director of manufacturing.

Ornulf Heiburg, Norwegian-born director of manufacturing at the two and a half year old, one-story plant, says that as far as he is concerned the Centralograph has already paid for itself in the few short months he's had it installed.

"It is unbeatable", he says, "for giving a superintendent a permanent detailed picture of both how and why or why not his machinery has run day after day and week after week. Not only have we more than made up the purchase price of the unit (about $2,000 in Canada) in getting increased production, checking on slowness and lateness, digging up bottlenecks, and planning ahead for a 100%-operation mill—but also our supervisory staff has an intangible peace of mind that comes with knowing that we know absolutely what our machines are doing, and if they haven't produced, why not. This latter aspect is almost as valuable in the long run as the close-range dollars-and-cents savings we are able to obtain from time to time." (*Textile World*, Vol. 102, June 1952)

SPUN DYED FIBRO IS ON THE WAY

Remarkable as are the properties of the synthetic fibers developed during the last 15 years it is clear that on economic and service grounds alone the products of the viscose and cellulose acetate processes will continue for a long time yet to be the backbone of the man-made industries. We have also seen that in many ways the coming of the synthetics will extend the uses of viscose and acetate staple fibers as blending techniques develop and expand. We should therefore be in no danger of assuming that we have exhausted the possibilities of the viscose and cellulose acetate processes or that these materials are ever likely to be at a standstill. Far from it. I wish to direct your attention to what I believe will be the next major advance in the range of

utilization of these materials and from here on I shall confine my remarks to viscose rayon staple. "Fibro" as you well know is the registered trademark of Courtaulds, Lt., for its production of viscose rayon staples for which it has built up in the past generation in England a productive capacity for some 3,500,00 pounds per week at 180 million pounds per annum. As you also know Courtaulds has influenced the production of this material in various parts of the world and is now engaged in establishing a production unit at Mobile, Ala.

The art of coloring in textiles has come a long way but has been with us since the beginning of recorded history and before. It has taken many forms such as raw stock, process, yarn, and fabric dyeing. In this age of specialization we can in our lighter moments amuse ourselves by debating the relative contributions to our industrial effort of the colorist and other trade specialists, but usually without revolving the issue. Suffice it to say coloring is a very important part of textile production.

As the standard varieties of Fibro got underway in the middle '30s Courtaulds began to explore the possibilities of coloring viscose rayon staple by including color pigments in the liquid viscose so that when the fiber is made it is colored to the core. Many difficulties, as would be expected, were encountered, associated with the supply, choice, and treatment of pigments, differential filtration, retention of solidity of shade matchings, and last but by no means least the choice of a restricted shade, staple and denier range with the maximum possibilities. Many things which are possible are not always practicable and this applies with particular force to the commercial production of colored staples.

The advantages of success were, however, obvious in terms of economic coloring in relation to fastness of shade as compared with conventional methods of dyeing. Slowly difficulties were overcome so that for many years now commercial production has been underway with spinners and fabric technicians using these colored fibers in their production. The late war and its aftermath retarded developments and utilization. Shortage of and heavy pressure on existing capacity for standard staples, yarns, and cloths quite naturally sidetracked the full development of spun dyed Fibro, production involving as it does changed habits, thoughts and practices, particularly in spinning mills.

Apart from the use of fibers in non-woven fabrics, of which we are certain to hear much more in the future, staple fibers must be spun into yarns before they can be used in fabrics. The advent of spun ryed Fibro with its blending possibilities adds only one more string to the many now converging on the spinners who face an already complex future of blending activity. Changes in process and methods are already here, as we can see by viewing the intense activity in the mechanical blending field and other changes will come. This does not mean that spinners must perforce break down their mass production techniques to engage in their scope spun dyed Fibro, but merely that they have to increase their technical grip on processing methods and strengthen the organizational control of production and marketing. Change is a law of life, adaptation to changing circumstances the price of survival and spinners can be no exception. Spun dyed Fibro at least offers a means to adding to the gaiety of mill life. The following staples and deniers are now available:

1.5-Denier, 1 7/16-in. Staple

Colors

12 Light blue
14 Red
15 Medium blue
16 Dark blue
17 Apple green
18 Malachite green
19 Sulphite yellow
20 Indian yellow
21 Pink
51 Khaki
52 Tan
55 Brown

3-Denier, 2-in. Staple

Colors

41 Red
43 Indian yellow
44 Sulphur yellow
45 Apple green
46 Malachite green
47 Light blue
48 Medium blue
49 Dark blue
61 Khaki
62 Tan
65 Brown

4.5-Denier, 6-in. Staple

Colors

31 Red
32 Indian yellow
33 Sulphur yellow
34 Light blue
35 Medium blue
36 Dark blue
37 Apple green
38 Malachite green
39 Pink
70 Brown
71 Khaki
72 Tan
75 Brown

Black

1.5-denier, 1 7/16-in. staple
3-denier, 2-in. staple
3-denier, 2½-in. staple
4.5-denier, 2-in. staple
4.5-denier, 4-in. staple
4.5-denier, 6-in. staple

In addition to the advantages deriving from non-interference with spinning properties, which in turn facilitates blending operations, spun dyed Fibro offers important economic advantages by providing, in general, a much higher color fastness ratio against relative cost as compared with conventional methods of dyeing. In terms of light and washing fastness as measured by standard tests, spun dyed Fibro yields very good results. It would be too much to expect at this stage of development that all these pigment colors should be fast to everything but except in relation to cross dyeing of some pigments with vat dyestuffs and the reaction of some pigments to solvents used in some methods of dry cleaning, the range of pigment colors as a whole is very fast. Exhaustive tests are being undertaken to correlate performance of the separate shades against accepted methods of testing and efforts

to improve performance, where necessary, are continuous.

It should be made clear that spun dyed Fibro colored staples being themselves viscose fibers retain their affinity for direct dyestuffs. Remember this is necessary whenever cross or over-dyeing is undertaken. On the other hand this affinity for direct dyestuffs makes possible some of the most important results of using spun dyed Fibro in blend or together with wool, cellulose acetate and many of the synthetic fibers. The cross dyeing performance of spun dyed Fibro against wool colors reveals the many advantages of being able to dye basic cloths to a variety of shades, when color requirements are known. (Harold Ashton, *Textile Bulletin*, 66, 68, 70, May, 1952)

BUGABOO OF THE THIRD SHIFT DECRIED AT GEORGIA MEETING

Elimination of third shift operations to offset "the depressing effect on our price structure which is caused by the excess production of that third shift" was proposed by Henry W. Swift before the 52nd annual convention of the Cotton Manufacturers Association of Georgia held April 16-18 at Boca Raton, Fla.

Addressing the largest attended convention ever held by the association, Mr. Swift, executive vice-president of Swift Spinning Mills, Columbus, Ga., and retiring president of the group, pointed out that although the number of productive units in the industry has declined, "the installation of high-speed, automatic equipment, coupled with multipleshift operation, has created a productive capacity that exceeds the normal demand for our products."

In the president's annual address to the association's 52nd annual meeting, Mr. Swift offered two solutions to the problems besetting this industry today.

"We can become engaged in a war of the survival of the fittest" during which the least efficient mills and those with inadequate reserves will be forced into insolvency and liquidation.

"Or we can calmly and realistically review the operating policies and practices of our industry and determine whether, in the interest of permanent stability and continuous prosperity, we can afford to maintain the multiple-shift overtime operations to which we became accustomed during the period of abnormal demand for our goods."

Millmen should seriously consider, Mr. Swift told the convention, whether reduced operating costs resulting from the third shift are not more than offset by the depressing effect upon the price structure caused by the excess production of the third shift.

Gov. Herman Talmadge of Georgia, a guest speaker at the meeting, joined Mr. Swift in an attack on the "distress area" directive of the Office of Defense Mobilization that would channel government contracts regardless of whether or not to the lowest bidders. The Georgia chief executive stated that this directive was merely to appease certain interests, and would open the way to corruption and inefficiency. Governor Talmadge also urged Georgia textile executives to make more use of the port of Savannah in shipping their products. He declared that 90 per cent of Georgia's cotton textile exports go through the port of New York when a considerable saving could be effected by exporting from Savannah.

Continuing its policy of selecting its leaders from the young men of its membership, the Cotton Manufacturers Association of Georgia elected J. M. Cheatham of Griffin, Ga., as its new president for 1952-1953. Mr. Cheatham is president of Dundee Mills, Rushton Cotton Mills and Lowell Bleachery South, all of Griffin, and of Hartwell Mills, Hartwell and Toccoa, Ga.

The new association president was born at Easley, S. C., on May 15, 1913, and became associated with Rushton Cotton Mills in 1933 upon his graduation from Georgia Tech. He is the son son of the late J. M. Cheatham, Sr., who was prominent in the textile industry, and who served as president of the Georgia association in 1935-36.

Other officers elected to serve with Mr. Cheatham included R. H. Jewell, vice-president of Crystal Springs Bleachery of Chickamauga, Ga., who was elected vice-president succeeding Mr. Cheatham, and George E. Glenn, president of Exposition Cotton Mills Co., Atlanta, Ga., who was elected treasurer succeeding Mr. Jewell. T. M. Forbes was re-elected executive vice-president and Frank Carter, secretary. Mr. Forbes has completed 25 years of service to the association, and he was cited at the annual banquet for his many contributions to the success of the organization over the years.

Seven new directors to serve with eight old directors on an enlarged board were named as follows: for three-year terms—J. H. Daughdrill of American Thread Co., Atlanta; Shannon Gamble of Standard-Coosa-Thatcher Co., Chattanooga, Tenn.; George H. Hightower of Thomaston (Ga.) Mills, Inc.; W. B. Smith of Washington Mfg. Co., Tennille, Ga.; and B. W. Whorton of Dixie Mills, Inc., LaGrange, Ga. For a two-year term: J. R. Newell of Mandeville Mills, Carrollton, Ga.; and for a one-year term: L. C. Rad-

ford, president of Monroe (Ga.) Cotton Mills. (*Textile Bulletin*, 59, May, 1952)

TEXTILE INSTITUTE TOLD OF GOVT. BLEND STUDIES

The growing interest of the United States Government in blended fabrics for use by the armed forces high-lighted the final session of the 37th annual conference of the Textile Institute here at the weekend.

Representatives of the American Army, Navy and Air Force described experiments — some of them still in progress — which are proving the worth of blends. All-wool fabrics are still regarded as tops for wearability but wool blends are proving superior in other tests, it was said.

American military textile experts agreed that, as far as the armed services were concerned, only wool blends were playing an important part in current plans for increased use of blended fabrics. Speakers frankly admitted that past and current experiments were merely touching the surface of possibilities for blends and that there was much to be learned as to the properties of blends and that there was much to be learned as to the properties of blends of wool with various man-made fibers.

The overriding purpose in the use of blends, as pointed out by Stephen J. Kennedy, research director of the Textile, Clothing and Footwear Branch, Research and Development Division of the Office of the Quartermaster General, is to further the program adopted since World War II that makes wool conservation measures by the military services a matter of national policy. An important, but secondary consideration, is to reduce expenditure, Mr. Kennedy added.

"**From the defense standpoint,** it is important that our military services have a wool conservation policy," Mr. Kennedy told the conference. "It should be backed up by a program which will make possible sound and prompt transition to some other basis than previous non-conservation standards, with assurance that anticipated requirements can be met both quantitatively and functionally.

"There is not a great deal to be said about fiber blends other than wool from the national defense standpoint in the United States. Conservation of cotton by mixing other fiber blends does not present the problem with us that it would in non-cotton-growing countries.

"There are national defense problems pertaining to some of the other fibers, such as cordage fibers and jute, but their possible substitution is not being approached basically from the standpoint of blends in our country as much as by possible outright replacements with other fibers.

The second of the basic causes for the study of blends in military textiles is that of cost- consciousness and the desire to limit expenditures. Such approach always should be present in military research and development, although it is subordinate to national defense policy and to the necessity of providing functionally adequate clothing for the soldiers." (J. W. Cohn, *Daily News Record*, June 9, 1952, page 23)

NON-FELTING WOOL AND WOOL MIXTURES

In reviewing the proposals made during the last twelve years for non-felting wool Dr. F. C. Wood drew attention to the large number of modifications of the old chlorination process, all aimed in the main at the reduction in the damage done to the wool fiber by such processes.

Great activity on the application of highly polymerized substances has been shown during the period and this, as Professor Speakman has suggested, has been due to the great success which the Tootal Broadhurst Lee Co.'s crease-resist process achieved on cellulosic materials.

With all this admirable activity on devising an additive cure there is a highly efficient method by the application of caustic alkali in a polar-non-polar mixed solvent which at the ordinary temperature produces non-felting wool products and may be applied practically to all mixtures of wool and other fibers.

In this process the high polymer wool protein itself—already keyed to the wool fiber—is used to mask the scale tips. The application of alkali to wool by this means has the following advantages:—

(1) Simplicity of preparation of the reagent.

(2) The solution may be used over and over again—merely being re-causticized.

(3) A small distillation plant is all that is required when distillation is finally required.

(4) Wool having the normal moisture of condition is the optimum condition for treatment.

(5) The action is thermostatic — no heat whatever being absorbed or evolved, thus ensuring no unlevelness due to uneven temperature.

(6) The treatments take place at the ordinary temperature. No high temperatures are required for curing or baking.

(7) Each fiber receives treatment owing to the low viscosity and low surface tension of the reagent.

(8) Nothing is added to the wool and nothing is taken away from it.

(9) Practically all mixtures of wool with other fibers can be treated without damage to the other constituent: e.g., wool/cotton, wool/linen, wool/nylon, wool/rayon.

(10) Softness of handle is maintained by reason of the very minimum of masking substance — wool protein-present.

(11) The products have a clean clear finish which does not become fuzzy or fluffy or hairy in wearing and washing.

(12) The non-felt effect is permanent and does not break down during the wearing and washing life of the material.

Acids damage cellulose, alkalies damage wool, said Dr. Wood. As in the T.B.L. crease-resist process acids are harnessed so that they do not damage the cellulose, so in the T.B.L. wool process using alkali in a new way, alkali is harnessed so that it does not damage the wool. The first is an internal harnessing of acid, the second is an external harnessing of alkali. (*The Textile Weekly*, 1415, May 23, 1952)

TROUBLE WITH TAFFETA

The off loom type of acetate of rayon taffeta that is very popular right now is also the cleaning industry's biggest headache, although most people in the textile business don't seem to understand why there should be any trouble with cleaning taffetas.

It is usually admitted that the finish in these fabrics has a tendency to water spot but that apart from this characteristic there should be no real difficulty restoring taffetas to a clean and presentable condition — provided they are drycleaned only.

The general impression seems to be that water spotting is like soil deposition; that somehow the cleaner can remove them. This is seen in the language of a hand tag taken from a yarn dyed, rayon taffeta dress a few seasons back which said in part: "Although fashion decrees these fabrics, they cannot be guaranteed for permanence of finish or against water spotting. (It is suggested) that should this garment become water spotted, it be sent to a reliable cleaner who will handle it as to help preserve its original appearance".

The truth of the matter is that drycleaners are not able to handle off loom taffetas as to help "preserve its original appearance" in a sufficient number of cases to permit a general statement of this sort to go unchallenged. We appreciate, therefore, the opportunity Rayon & Synthetic Textiles has given us in this issue to clear away some of the misconceptions people have of the nature of water spotting of off loom taffetas and of the cleaners' ability to cope with this and other service problems with these fabrics.

To accomplish this we list the following facts and explanations considered essential to a complete understanding of the problems:

(1) A water spot is a physical change in the basic characteristics of the cloth, not a deposition of foreign matter as we ordinarily think of a spot or stain.

(2) A water spot cannot be removed by the cleaner in the way that he does foreign matter. What he can do is make the spot less noticeable by feathering it outward from the center with a steam gun or water spraying device.

(3) The removal of a water spot or marking does not restore the affected area to its original qualities of hand and appearance. In fact, on close inspection, the light reflectancy of the affected area has changed from the surrounding unaffected areas, resulting in a contrasting surface appearance that is quite noticeable when viewed at an angle. Such stains are often noticeable to a woman looking down at her own skirt than when looked at while held close to view in the hand.

(4) The warp yarns which hold the sizing that gives taffeta its crispness are of smaller diameter after having been wet than the warp ends in unaffected portions of the cloth. This is easily seen under a microscope, but is plainly evident also when the affected area is held to view in front of a light source.

(5) When the sizing in off loom taffetas of low yarn count has been disturbed by water spotting, resistance to yarn slippage is severely reduced. Such materials have been noted to slip so badly as to be utterly useless after wetting.

(6) Many types of spots and stains that people expect drycleaners to remove from their clothing are not soluble in organic cleaning solvents.

(7) In the strictly drycleaning phase of the entire process of cleaning, a certain amount of limpness will develop due to the effect of the mechanical action of machine washing and tumble drying. Where this condition is noted in fabrics that exhibit actual loss of sizing, the original crispness can be restored usually by applying a light spray of water followed immediately by hand ironing or hot-head type machine pressing.

(8) Because off loom taffetas are of the general class of fabrics which do not undergo any wet processing after looming, as do greige goods, shrinkage is also a problem for the cleaner when handling garments made of these cloths. As this problem will be discussed in detail at a later date,

we will only say now that shrinkage of as high as 6 percent in the warp or lengthwise direction of the fabric should be expected in wetcleaning taffetas, the same percentage shrinkage in five drycleanings. We do not presume to know how textiles should be made and finished for satisfactory end-use service. It does seem obvious to the drycleaner, however, that a practical solution to this problem is simply the use of an insoluble warp sizing, or at least one which resists dissolution. There are doubtless good reasons why such a solution, as simple as it may appear, is not easy to accomplish. But if that is the case, the problem should be a challenge to the chemical industry to produce a compound which will serve satisfactorily both as a warp sizing and as a fabric finish. (Albert E. Johnson, *Rayon and Synthetic Textiles*, 32, 33, May, 1952)

TEXTILE RESEARCH ACHIEVEMENTS IN 1951

New fibers and yarns developed in the United States during 1951 were limited in number. An 8-denier crimped viscose staple was made in small quantities to attempt to simulate the hand of 58's wool. A product of the state of Vermont, was "Algil" fiber made from polystyrene for use in batting form as a filtering medium. Late in the year, the American Cyanamid Company produced limited poundage of "X-51", an acrylonitrile fiber, while the patent literature disclosed active research on similar materials by the Industrial Rayon Corporation and the Celanese Corporation. And not so long ago it was reported that Orlon "B" was a new bulkier type Orlon yarn being made on a laboratory by the du Pont Company.

A chemical treatment to give cotton high dyestuff affinity and shrinkage of less than one per cent was announced as a joint process of the Aberfoyle Manufacturing Company and Switzer Bros., Inc., while a hydrocyanic acid treatment for cotton described by a Texas scientist as a means of improving the fiber strength was newsworthy but of no practical value. Cellulose-destroying microorganisms were found by Kendall Mills research workers to be causing considerable damage to cotton in many areas and the new term "Cavitomic" was coined to describe the infected cotton. Announced some time ago as a substitute for jute, the first acreage of "Kenaf" was planted in Florida during the summer.

Long known for its merits in fiber form for pillows and as a buoyant filler for life-preserving garments, Kapok was processed into a web and sliver suitable for spinning according to a British patent on a new carding method.

A happy marriage of the new and the old was suggested in the treatment of wool fabric with some nylon compounds to improve abrasion resistance and decrease felting shrinkage. From England came word of the use of iodine solution to make wool suitable for medicated wound dressings, at the same time imparting moth-resistance. For modifying wool to reduce its moisture absorption and felting characteristics and alter its hand while adding weight, beta-propiolactone was offered for experimental use by a chemical company after the results of laboratory studies at the Western Regional Research Laboratory were made public. (Julius B. Goldberg, *Rayon and Synthetic Textiles*, 39, May, 1952)

VISCOSITY MEASUREMENTS

During recent years the cotton industry, particularly cotton finishers and trouble-shooting laboratories of large merchandising firms and laundries, have begun to apply, to an increasing extent, certain laboratory tests that are more or less standard procedures for manufacturers of rayon and other synthetic textiles and for the pulp industries.

These tests, known technically as measurements of the viscosity (or fluidity) of cellulose, tell as much or more about the quality of a piece of cotton cloth, or of the cotton fiber itself, than do many of the tests in more general use. They reveal the precise extent to which the fiber may have been damaged by weather or sunlight, or the fabric by bleaching, mercerization, dyeing, or other finishing methods. In some instances they probe beyond the immediate deterioration to foretell latent damage not readily discernible by other means.

A viscosity measurement is pretty much what the name implies—an indication of the sluggishness or fluidity of a liquid, which is most readily evidenced by the rate at which the fluid flows under carefully controlled conditions.

As cellulose itself is not a fluid, it must be dissolved in a liquid for the test. Only a very few special liquids will dissolve native cellulose. Those which are suitable for the purpose are quite alkaline, aqueous mixtures. Sometimes, depending on the type of damage under study, it is desirable first to treat the cellulose with nitric acid, which changes it into a type of "gun cotton" that can be dissolved in a much greater number of organic liquids.

The solution then is forced, or allowed to flow under its own weight, through tiny glass capillary tubes in a viscometer, to determine its rate of flow. A slow rate, when the solution is thick and sirupy, indicates very high quality cellulose, or

a high degree of polymerization—"D.P." as the chemist calls it. A fast rate, where the solution is quite thin and limpid, indicates cellulose with a low degree of polymerization.

Chemists look upon cotton as composed principally of long chains of cellulose molecules—thus constituting what is known as high polymer, made up at its best of something like 5,000 exactly similar units linked together in a long chain like a chain of beads. The chains are assembled roughly parallel to one another, and each chain may pass through a considerable number of alternating crystalline and non-crystalline regions. Many things—acids, alkalis, heat, mildew, light, smoke and a host of others—can damage the cellulose, particularly in the non-crystalline or amorphous areas. This causes the chains to break with separation of some of the units and a corresponding reduction in the degree of polymerization. Thus, when a chemist says the viscosity measurement shows that the cellulose in cotton or a cotton fabric has a high "D.P." he means the fiber or fabric is practically undamaged, and when he says the test shows a low "D.P." he means there is considerable damage.

Since any damage to the length of the chains in cotton affects its usefulness, the viscosity measurement has numerous possibilities as a diagnostic aid in identifying and correcting troublesome situations throughout the processing industry and in developing new treatments. Its advantages are most obvious, perhaps, in the finishing plant—to check the action of the various chemicals used in bleaching, kiering, mercerization, dyeing, treatments for crease resistance, and the like.

Nevertheless—and this is in direct contrast to the situation with rayon and other man-made textiles, where viscosity measurements are recognized as a necessary control step in various stages of processing—these tests are not yet making their largest contribution to cotton manufacturers through application in the processing plant, or even in commercial testing laboratories. Rather, they are serving the cotton industry most through their usefulness to scientists who are developing the basic information needed to understand the causes and extent of deterioration in cotton cellulose and to develop preventive measures.

The methods also are used by large fabric merchandisers in control laboratories as a check on quality. A great advantage in this use is that latent damage, which would not show in the usual tests for fabric strength until weeks, or perhaps months, later can be detected immediately by a viscosity measurement. Immediate detection of such damage can forestall many complaints from customers about fabrics that appeared in good condition when purchased, but later lost their strength—on washing with soap or soda, for example.

In the past there were many obstacles to the widespread application of viscosity measurements by cotton manufacturers, but some of these have been overcome during recent years. With the practical aspects of these tests now generally recognized, ways are being sought to overcome other difficulties in order to make the techniques of still more value to cotton. The Southern Regional Research Laboratory has conducted studies along this line for several years as part of its overall program to improve the utilization of cotton line. (*Textile Industries*, 116, May, 1952)

EVALUATING A NEW FIBER

The past ten years have seen the methods for evaluating a textile fiber become at once both increasingly complex and increasingly precise. Such fiber characteristics as elastic and plastic behavior at various levels of strain have come to supercede simple measurements of tensile strength and elongation to rupture; the concept of time as a basic element in the analysis of textile materials has come to be recognized as a variable extremely significant in textile physics; the effects of yarn and fabric geometry on the translation of desirable fiber properties into useful fabric properties have come to be defined, measured, and, in part, applied to the prediction of fabric quality and performance under service conditions.

The complexity of the problem is, of course, inherent in the nature of textile materials. However, our awareness of this complexity and our ability to analyze the problem so presented has depended upon the design of a completely new set of instruments with which to measure the properties involved. For ten thousand years the changing patterns of textile designers, developed largely "by guess and by gosh," and quantitative measurements of the properties of fibers, yarns, and fabrics were unknown. During the period between World War I and II, there was introduced a fairly wide-scale use of tensile testing equipment, adapted from machines used in the testing of rigid structural materials such as steel, wood and concrete. Tensile strength and elongation to rupture became limiting factors governing textile specifications to the point that their use took on a semi-religious fervor, blinding the industry to the inadequacies of both the testing instruments and the physical data obtained. This

condition still exists in many parts of the industry.

The measurement of tensile strength and elongation to rupture dominated all physical investigations of textiles for many years. A number of problems and unanswered questions kept forcing their way through these data. It gradually became clear that poor correlation existed between these physical data and end-use performance. Strong fibers frequently performed less efficiently that weak fibers; increasing the strength of yarns and fabrics, as demanded in civilian or military fabric specifications, rarely solved the problems associated with the "weaker" material. While it has been observed that the natural fibers were not perfectly elastic (were non-Hookian, in that stress and strain were not proportional throughout the portions of the stress-strain curves representing recoverable deformations), little significance was attached to this phenomenon.

Finally, about ten years ago, the confusing and conflicting evidence became overwhelming. Coincident with this, advances in the physical chemistry of high polymeric materials and in the physics of testing stimulated a series of steps which may be summarized as follows:

1. Since textile fibers of both natural and man-made origin exhibited anomalous elastic behavior, steps were taken to design tensile loading devices of the constant rate of extension type (rather than the traditional constant rate of nothing testers of the pendulum type, or constant rate of loading testers such as the inclined plane types). Such an instrument, now being made commercially by Instron, Inc., and others, was developed through the joint efforts of Massachusetts Institute of Technology, Textile Division and Fabric Research Laboratories, Inc. Using a canti-lever beam, on which were mounted a set of strain gages, the take-up and decay of load as the fiber was strained could be readily detected. The use of this instrument clearly illustrated that practically all textile fibers evidenced three distinct portions in their stress-strain curves:

   a. A small region of complete elasticity.
   b. A larger region of load decay, where
   c. A final region of varying magnitude, in which the stress and strain may or may not approach a Hookian relationship; in either case, the stress per unit strain increases over (b) above.

2. This led to the question: how do textile perform under the wide range of stress conditions to which they are subjected, if a yield point is reached at such low stress concentrations: It would seem that textiles could not be rendered dimensionally stable, if the concept of yield points taken from classical mechanics has any validity.

Clarification of the apparent conflict between experience and theory came from two new areas of understanding:

   a. Stress analysis of the distribution of destructive forces under service conditions indicated that very rarely was any one fiber within a composite textile structure subjected to more than 5 per cent strain, and frequently the strains were of an order of magnitude of 2 to 3 per cent.
   b. Further analysis of the nature of the stress-strain curve presented clear evidence that each total curve is the sum of three component parts, manifesting respectively:
      (1) Perfect Elasticity: That part of the curve where stress is proportional to strain; that elastic component responsible for immediate elastic recovery.
      (2) Complete Elasticity: That part of the curve wherein the strain is completely recoverable with time; that elastic component responsible for delayed elastic recovery.
      (2) Imperfect Elasticity: That part of the curve wherein the strain is non-recoverable with time; that component responsible for non-recoverable deformation.

Therefore, the factor of time is introduced in all considerations of textile performance, keeping in mind the low strains under which fibers perform, before initiating a study of any textile fiber or its products. (Simon Williams, *Rayon and Synthetic Textiles*, 31, 58-9, June 1952)

UPGRADING MEDIUM AND LOW-GRADE COTTONS

Combers are sometimes considered to be machines whose employment is limited either to the production of super-quality yarns required for special purposes or to fine counts—high grade cottons being employed in both cases. This is very far from the truth.

In some circumstances it may be an economic proposition to comb medium and low-grade cottons. The combing process modified the length distribution characteristics of the material and increases its effective length, as a result of which

the yarn strength is improved. In addition, nep content is reduced, a lower end breakage rate gives improved spinning efficiency, and yarn appearance is enhanced.

Obviously, it must be left to each spinner to determine whether any upgrading of his cottons by combing is likely to be worthwhile, or to what extent the process can be carried economically; but in order to give those spinners who are unfamiliar with the subject an indication of the effects of combing such cottons, this article outlines some tests we have carried out to determine how yarn quality is affected by extracting as waste various percentages of short fiber.

It is not suggested that in the combing of medium and low-grade cottons the waste percentages extracted should be of the same order as those employed in normal combing, but that a comparatively low extraction might bring about a worthwhile improvement.

A very good guide to the potentialities of any particular cotton can be obtained from the Baer sorter diagram. In general, it is possible to increase the effective length by removing in the waste those fibers whose lengths are slightly more than one half the original effective fiber length, and all shorter fibers.

An American Uplands cotton of 1 3/16 in. staple length was used for the tests described in this article. With American type cottons, the effective length is to all intents and purposes the same numerically as the staple length.

Test results were:

1. The analysis of variance indicated that the random errors were insignificant when compared with the variations due to processing.

2. It was found that each 5% increment of comber waste extracted, accompanied by the necessary corrections to sliver hank at the draw frame, led to a progressively reduced nep content. As a result of this, the blackboard appearance of the yarn was progressively improved.

3. The Count X Strength product was improved as more waste was removed. Each of the tests showed a skein strength increase of about 4% on its immediate predecessor.

4. The single thread tests showed a corresponding improvement in strength as the waste extraction was increased. This increase was of the order of 5% for each of the tests.

5. As regards the fiber properties, an increase in effective length from 1 3/16 in. to 1 5/16 in. was measured between the carded yarn and the combed material with 10% waste removed. There was a significant increase in the mean fiber length between carded and combed yarn at 5% waste extraction, although above 5% there was no tendency towards further increase in mean length with this particular cotton. Similarly, the percentage of short fiber was significantly reduced between carded and combed material with a 5% waste extraction, but further increases in the amount of waste removed showed only a small reduction in the percentage of short fiber remaining in the material. (*Textile Manufacturer*, Pape 237-238, May, 1952)

AUTOMATIC YARN PACKAGE DYEING

Starting even before the war there have been developments in yarn preparation, weaving and knitting by the use of automatic machines which called for a new technique in package dyeing. Samuel Pegg and Son (in common with a number of other firms) had machines which embodied certain satisfactory principles for package dyeing, but they did not control the processes automatically.

For some time, and in collaboration with the Drayton Regulator Co., Ltd., and some of the leading firms in the textile trade, they have been doing serious research on the needs of a modern package dyeing system. The outcome of this important work is the new Pegg yarn package dyeing machine, based on the patented Franklin spring process, and embodying Drayton controllers for automatic flow reversing of dye liquor, and time and temperature control. Mr. Helliwell, general manager of Pegg's, said to the Textile Weekly representative that they had been looking for satisfactory methods of solving these problems for many years, and he was convinced they had now found them, both for the Pegg machines already installed in yarn dyeing plants and on their new machines, which would dye any form of yarn package, and every type of textile yarn.

Much has been written, and debated at length, on the actual application of the dyes in pressure dyeing, and many notable papers were read at the S.D. and C. Symposium in March. Mr. E. J. Caswell, in the American Dyestuffs Reporter (April 1952) showed how the type of yarn and its source, type of package and winding, method of dyeing, extraction and drying, were all factors to take note of, and comes to the conclusion that the Franklin spring method has the following advantages:—

(1) Less resistance to the flow of liquor.
(2) The larger area at the core gives a better ratio to the outside area.
(3) The distance from the core to the outside is less than other types.
(4) More packages can be packed on to one dye spindle than by any other method.

(5) When compressed on a dye spindle, they form a beam of uniform density.

(6) The capacity of a dyeing machine packed with Franklin packages is at least 25% greater than with other types of packages.

The new features are the automatic Drayton controllers fitted to the Pegg machine. There are two sets of instruments. One is an automatic dye liquor flow reversing controller. The timing unit controls the reversal of the dye liquor flow in both directions (In/Out), that is from the inside of the yarn package outwards, and from the outside of the package inwards, with precise automatic control of the period of dye liquor flow through the yarn package, which is the most important feature of all for perfect yarn dyeing. The point the trade needs to grasp is that the timer can give either equal periods of flow or unequal periods of flow, as desired by accumulated experience, just as required by the user. Moreover, there is a four-way switch, and set in the "auto" position the timer will work alternately and continuously at the periods as set until the time cycle is completed as set by the dye works management.

That is only half the story, for the controller always starts up on the same way flow you desire on the Out/In, irrespective of the position when stopped. In addition to all this, the Pegg system can still be hand operated when required.

Remarkable as is the flow reversing controller, equally important are the automatic D. V. 3 time and temperature controls. This unit consists of an instrument which takes over a minimum temperature of 60°F. and provides absolute control of everything required up to a maximum temperature of 22°F. Merely by setting pointers on dials these things can be made to happen:

(1) Adjustable rates of temperature rise of dye liquor variable from 1.5°F to 7°F. per minute can be obtained.

(2) Having reached the minimum temperature the controller takes over, and gives the uniform rate of rise (as set) to the maximum working temperature.

(3) At maximum temperature the temperature of the dye liquor is maintained constant throughout the dye cycle.

(4) If further processing is still required a further time period is put on the instrument clock, and it is carried out exactly under the control as predetermined and set.

(5) Throughout the time cycle the green control light always indicated, but the instant the cycle is complete (when the clock pointer is at zero) green goes out and red light comes on.

(6) At "auto" position time and temperature are automatically controlled as set; at "open" steam is supplied direct, and at "closed" position all steam to the Pegg machine is cut off completely. (*The Textile Weekly*, 1093-94, April 18, 1952)